

Title

Benefits of New Use Sites for Chlormequat Chloride to Support First Food Crop Use

Data Requirement

No guideline

Purpose of Supplement

Provide additional information per EPA request

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STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS

No claim of confidentiality, on any basis whatsoever, is made for any information contained in this document. I acknowledge that information not designated as within the scope of FIFRA Sec. 10(d)(1)(A), (B), or (C) and which pertains to a registered or previously registered pesticide is not entitled to confidential treatment and may be released to the public, subject to the provisions regarding disclosure to multinational entities under FIFRA 10(g).

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GOOD LABORATORY PRACTICE STATEMENT

This report is not required to be conducted in compliance with the requirements of Good Laboratory Practice regulations (40 CFR Part 160).

This report is a compilation of technical information and it did not have a study director.

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INTRODUCTION

Taminco US LLC, a subsidiary of Eastman Chemical Company, 200 S. Wilcox Drive Kingsport, TN 37660-5147, is submitting, pursuant to FIFRA sections 2(bb) and 3(c)(5), a report outlining the economic, social, and environmental costs and benefits of our proposed end use product, Adjust™ SL. The product is a soluble concentrate that contains 5.7 lb of the active ingredient (a.i.) 2-chloroethyl trimethyl ammonium chloride (chlormequat chloride)/ gallon). Chlormequat chloride is a plant growth regulator used to manipulate apical dominance and produce shorter, thicker, stronger stems for improved lodging resistance in wheat, triticale, barley, oats and grass grown for seed through early stage gibberellin synthesis inhibition.

For winter wheat, the recommended application rate is a single application of 1.0 lb ai/A between at GS 31-39 (the 1-node stage to the flag leaf collar visible stages). Adjust™ SL may be applied as a split application of 0.55 lb ai/A between GS 12 (the 2-leaf stage) and GS 30 (the beginning of stem elongation stage), followed by a second application of 0.44 lb ai/A between GS 31-39 (the 1-node stage to the flag leaf collar visible stage). The recommended rates for spring and durham wheat are the same, except the second application of the split application should be made between GS 31 and 32 stages. If the second application is not possible at GS 31-32 due to environmental or field conditions, do not apply later than GS 39. Do not apply more than 1.0 lb ai/A per season.

For winter barley and oats, the recommended application rate is a single application of 1.27 lb ai/A between at GS 31-39. Adjust™ SL may be applied as a split application of 0.63 lb ai/A between GS 12 and GS 30, followed by a second application of 0.63 lb ai/A between GS 31-39. The recommended rates for spring barley and spring oats are the same, except the second application of the split application should be made between GS 31 and 32 stages. If the second application is not possible at GS 31-32 due to environmental or field conditions, do not apply later than GS 39. Do not apply more than 1.27 lb ai/A per season.

For triticale, make one application of 1.0 lb ai/A to 1.27 lb ai/A between GS 31 – GS 39.

For grasses grown for seed apply 1.34 lb ai/A to 4 lb ai/A as a broadcast, foliar spray to actively growing grass between GS 31 – GS 39

DESCRIPTION OF PROBLEM

Lodging occurs in grain crops in any given year and the estimated associated yield loss can range from 7-30% (Fischer and Stapper (1987). Lodging effects on high -yielding crops of irrigated semidwarf wheat. Field Crops Res 17:245 -258)

Factors influencing the amount and severity of lodging include abiotic factors such as precipitation and wind. Biotic factors can also affect lodging, with taller varieties of grain crops generally being more susceptible to lodging. Inherent stem strength is also a factor. The persistence of lodging increases as fertilization inputs increase, creating a yield limiting factor in US grain production. The use of chlormequat chloride strengthens the stem allowing for higher nutritional inputs, resulting in higher yields with a reduced incidence of lodging.

Quality of lodged grains is usually lower than for standing crops, due to the influence of poor maturation, long wetness periods and potential for mold. Reductions in grain quality affect economic returns. As new marketing activities progress, a broader range of quality parameters may factor into how premiums are paid on best quality grain as well. In damp conditions, lodged grains take longer to dry than standing grains which can lead to sprouting of the damp kernels. Moist, lodged areas of cereal grain fields have a major impact on harvesting logistics as well. Lodged grains take longer to combine, which is a serious problem for growers with extensive acreages and narrow windows of time for ideal harvesting conditions. Harvest efficiency also decreases the amount of fuel used, increasing grower profits and decreasing carbon emissions. After harvest, mats of lodged straw are more difficult to cultivate into an acceptable seed bed for the following year. The problems associated with lodged grain crops have a significant negative impact on farm productivity and profitability. The photos below capture examples of lodging in cereal production.



Serious lodging in a barley field.
Harvesting in this area would be slow and inefficient.



Lodged wheat in a field not treated with Adjust™ SL.
The lodged area behind the technician is likely a complete loss at harvest.

BENEFITS OF ADJUST™ SL

Currently, the only plant growth regulators registered by the US EPA for use on wheat, barley, oats, triticale, and grasses grown for seed are Palisade EC and Palisade 2EC. Both products contain Trinexapac-ethyl.

Compared to the current standard of Trinexapac-ethyl, chlormequat chloride has a broader application window. Adjust™ SL can be applied from GS 12 – GS 39 whereas Palisade EC and Palisade 2EC are limited to GS 30 – GS 39. This is due, in part, to the fact that chlormequat chloride suppresses early stages of gibberellin biosynthesis and has longer residual effect. Adjust™ SL also contains inert ingredients that work in combination with the active ingredient, chlormequat chloride, to greatly enhance the product's uptake, utilization and effectiveness within the plant. The plant will respond under cold conditions, which results in maximum manipulation of rooting, tillering and apical dominance. These are characteristics that are largely determined during the early growth stages of the crop. This broader application window also allows growers to mitigate environmental conditions, such as wet field, that may impact the ability to apply the plant growth regulator in a narrower agronomic growth stage window.

Adjust™ SL also offers greater crop safety when mixed with other pesticide products. This increases the number of tank mix options, safening chlormequat chloride and allowing later applications without risk to yield.

EFFICACY

In high management and high yield trials in 2017 and 2018 conducted at Michigan State University, University of Kentucky, University of North Dakota and University of California Davis

2017 and 2018 Trial Means (13 Trials)			
Treatment	Yield (bushel/acre)	Plant Height (cm)	Lodging %
Untreated	91.73	88.72	50.80
Adjust 25 oz/Acre GS 30-32	97.32	86.20	40.00
Mean Impact	5.59 bushel/acre increase	2.52 cm decrease	10.8% lodging decrease*

*2018 data only, not recorded in 2017

CONCLUSION

This Public Interest Finding (PIF) clearly demonstrates the need for a chlormequat chloride registration in agricultural food production in the US. Chlormequat chloride offers growers a valuable tool by providing a larger application window with a unique mode of action in the control of lodging in wheat, barley, oats, triticale, and grasses grown for seed when compared to the current standard.